## REMARKS

A total of 52 claims remain in the present application. The foregoing amendments are presented in response to the Office Action mailed September 11, 2003, wherefore reconsideration of this application is requested.

By way of the above-noted amendments, original independent claims 1 and 2 have been amended to more clearly define features of the present invention. No disclaimer of subject matter is implied by these revisions, which are presented for clarity only. Claim 16 has been amended to correct a typographical error, and claims 22 and 23 have been amended to be dependent from claim 20. The specification has been amended at page 1 to properly identify the related application.

In preparing the above-noted amendments, careful attention was paid to ensure that no new subject matter has been introduced.

Referring now to the text of the Office Action:

a) claims 16-18, 22 and 23 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite;

b) claims 1, 2, 4, 6, 7, 16-23, 25, 27, 28, 36-43 and 52 stand rejected under 35 U.S.C. § 102(b), as being anticipated by United States Patent No. 5,257,261 (Parruck et al.);

c) claims 5, 8, 9, 26, 29, 30 and 44 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,257,261 (Parruck et al.);

d) claims 2 and 24 stand rejected under 35 USC § 103(a) as being unpatentable over the teaching of United States Patent No. 5,257,261



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(Parruck et al.) in view of United States Patent No. 6,160,819 (Partridge et al.); and

e) claims 10-15, 31-35, and 45-51 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As an initial matter, applicant appreciates the Examiner's indication of allowable subject matter in claims 10-15, 31-35, and 45-51. With respect to the other claims, the Examiner's rejections are believed to be traversed by the above-noted claim amendments, and further in view of the following comments

Rejections under 35 U.S.C. § 112, second paragraph

It is believed that the Examiner's rejections of claims 16-18, 22 and 23 under 35 U.S.C. § 112, second paragraph are fully traversed by the above-noted amendments in claims 16, 22 and 23.

Rejections under 35 U.S.C. § 102(b) and 35 USC § 103(a)

In paragraph 4 of the Examiners detailed action, the Examiner asserts (in part), that "Parruck teaches a channel processor (e.g., 10-2 in FIG. 1a) adapted for aligning a respective first hyper-concatenated data stream ... with a second hyper-concatenated data stream...". Applicant respectfully submits that this interpretation is not supported by the Parruck et al reference.

United States Patent No. 5,257,261 (Parruck et al.) teaches a system for concatenating a plurality of lower level SONET signals into a higher level SONET signal. Thus, in the example embodiment described by Parruck et al., a set of four parallel STS-3 signals are concatenated into a single STS-12c signal. As described by Parruck et al. this functionality permits a high level SONET signal (i.e. the STS-12c) to be inverse multiplexed into four lower level (STS-3) signals, which can then be transmitted through parallel channels



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of an optical communications network. At a receiving node, the inbound STS-3 signals can then be recombined to recover the original STS-12c signal. As is well known in the art, and described by Parruck et al., this technique enables high level SONET signaling to be transported across lower-speed legacy network infrastructure. (See col. 1, lines 14-62). Thus it is clear that the "channel processors" of Parruck et al operate to align (and thereby concatenate) the data within inverse-multiplexed data streams (the STS-3 signals).

As noted in the background to the present invention, inverse multiplexing of higher rate signaling for transport over lower-rate infrastructure is well known in the art, and, likely predates Parruck et al. However, all of these prior art techniques require a significant amount of signal processing, and are severely limited in the range of different concatenation schemes that can be accommodated. The system of Parruck et al. suffers both of these limitations. In particular, Parruck et al require that the STS-3 frames be demultiplexed to separate the data from the frame, and extract at least the J1, H3 and O3 bytes from the Path Overhead (POH) overhead (See Parruck et al., FIG. 2). Each of these elements must then be individually stored and/or processed to resolve not only differences in arrival times across the four STS-3 signals, but also differing pointer justifications within each STS-3 signal. This processing is essential for successful multiplexing of the data from each STS-3 into the SPE of the STS-12c signal. In addition to the inherent complexity of the circuitry required to perform this signal processing, this approach suffers the (related) disadvantage that it cannot accommodate a range of different concatenation schemes. In particular, the system of Parruck et al can be constructed by concatenating multiple STS-3 processor chips (as described by Parruck et al.) or, conceivably, by combining several such chips into a single application specific integrated circuit (ASIC), in a manner well known in the art. In either case, the resulting system will only concatenate four STS-3 signals into an STS-12c. Although the teaching of Parruck et al may be used to guide the design of systems for performing different concatenations, it remains that each such different concatenation requires the design and construction of a respective different system (ASIC). Thus, for example, if it is desired to



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concatenate three STS-1 signals into an STS-3, then a t systems (ASICs) designed for that purpose must be provided. Thus it will be seen that United States Patent No. 5,257,261 (Parruck et al.) is representative of precisely the prior art over which the present invention is defined.

The present invention is directed to solving the problem of aligning hyper-concatenated (as opposed to merely inverse multiplexed) data streams. As described at page 10 lines 3-25:

> For the purposes of the present invention, the terms "hyper-concatenation" (used as a noun) and "hyper-concatenated connection", shall be understood to refer to a communications path composed of multiple channels that are linked together such that alignment of data streams within each of the member channels is ensured, at least at extreme ends of the communications path. ...The term "hyper-concatenated data stream" shall be understood to refer to a data stream within a hyper-concatenated connection.
>
> Data signals (which may comprise an arbitrary mixture of concatenated and non-concatenated signal traffic) are inverse-multiplexed and transported through the hyper-concatenated connection distributed across multiple hyper-concatenated data streams. (Underlining added)

Thus it will be readily apparent that the "hyper-concatenated data streams" required by the present claims are not merely lower rate signals produced by inverse multiplexing a specific higher rate signal to produce specific lower rate signals, as in Parruck et al and Partridge et al. Instead, "hyper-concatenated data streams" convey the results of inverse multiplexing "an arbitrary mixture of concatenated and non-concatenated signal traffic". It therefore follows that each hyper-concatenated data stream must inherently exhibit an arbitrary concatenation, which may change frequently, and which will generally not be known in advance. In fact, it would likely be fair to state that within a hyperconcatenated data stream, the signal concatenation is undefined.

In stark contrast to the arbitrary (and undefined) concatenation exhibited by hyperconcatenated data streams, the concatenation of the lower rate signals of Parruck et al is strictly defined by the desired multiplexing operation. For example, a system in



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accordance with Parruck et al designed to multiplex four STS-3 signals into one STS-12c must receive four STS-3 signals, and can only output an STS-12c. If three un-concatenated STS-1 signals were received on one of the four channels instead of the expected STS-3, the system of Parruck et al will fail. Thus it will be seen that the prior art systems (as represented by Parruck et al) do not attempt to process hyper-concatenated data streams, and in fact cannot do so. Nor can they be modified to be operative for aligning hyper-concatenated data streams.

In light of the foregoing, it is submitted that Parruck et al does not teach or suggest a channel processor adapted for aligning a respective first hyper-concatenated data stream ... with a second hyper-concatenated data stream..." as alleged by the Examiner.

The remaining references do not supply the missing teaching. United States Patent No. 6,160,819 (Partridge et al.) teaches an inverse multiplexing scheme in which a high-level signal (e.g. an OC-192) is inverse multiplexed across a set of lower rate signals (e.g. four OC-48 signals) using a byte-by-byte stripping technique. In order to be conveyed across conventional SONET infrastructure, however, each lower rate signal must conform to the SONET standard. Since the formatting and concatenation of the original high-level signal is lost (due to the byte-wise stripping of the signal across the multiple lower rate signals, each lower rate signal must strictly conform to the SONET standard. Furthermore, recovery of the high-level signal at a receiving end requires advance knowledge of the concatenation of at least the low level signals. Accordingly, Partridge et al cannot accommodate the inherently arbitrary (and unknown) concatenation of hyper-concatenated data streams.

In light of the foregoing, it is respectfully submitted that the presently claimed invention is clearly distinguishable over the teaching of the cited references, taken alone or in any combination. Thus it is believed that the present application is in condition for allowance, and early action in that respect is courteously solicited.

If any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this response, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees



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required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to our Deposit Account No. 19-5113.

Respectfully submitted,

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Date: December 5, 2003

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